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Search Notes

LITIGATION-6367613

Source: Legal > Area of Law - By Topic > Patent Law > Patents > U.S. Patents > **Utility, Design and Plant Patents**
Terms: **patno=6367613** (Edit Search | Suggest Terms for My Search)

645041 (09) 6367613 April 9, 2002

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6367613

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Link to Claims Section

April 9, 2002

Belt cleaning sprocket

APPL-NO: 645041 (09)

FILED-DATE: August 24, 2000

GRANTED-DATE: April 9, 2002

CORE TERMS: belt, sprocket, fluid, conveyor, facing, conduit, spray, inwardly, outlet, teeth ...

ENGLISH-ABST:

A sprocket for an endless conveyor is disclosed having a plurality of fluid outlet passages arranged radially between the center of the sprocket and its outer circumferential surface. The outlet passages are positioned along the length of the sprocket in a helical path and are in fluid communication with an annular fluid conduit extending lengthwise along the center of the sprocket. A fluid inlet connected to the conduit supplies fluid under pressure to the conduit, the fluid spraying radially outwardly through the outlet passages to impinge on the inside surface of the endless conveyor and remove any accumulated debris. Nozzles are positioned within the outlet passages to control the fluid spray.

SUMMARY:

FIELD OF THE INVENTION

This invention relates to sprockets used with endless conveyors, and especially to sprockets which are adapted to clean the conveyor when in operation.
BACKGROUND OF THE INVENTION

Conveyors comprising sprocket driven endless belts are used in a wide spectrum of industrial applications to transport items being manufactured or processed from point to point. The items being transported may leak or ooze liquids of varying viscosity, or shed dust, dirt, particles or debris which can accumulate on the belt and foul the conveyor.

This problem is especially acute in meat processing equipment where cuts of meat are transported on conveyors between processing stations and ooze blood, deposit viscous or congealed fat, cartilage, muscle, and other animal carcase liquids and debris onto the belt. Such organic matter cannot be allowed to accumulate on the conveyor because it quickly decays and presents a health hazard, rendering the conveyor unusable to transport meat for human consumption.

While it is a relatively simple matter to wash the outside surface of the conveyor on which the meat is supported to remove any accumulated organic matter, the various liquids and soft debris tend to work their way into and through crevasses, joints, hinges, interfaces and openings in the belt and a substantial amount of unwanted organic matter thereby accumulates on the inside surface of the belt and on the drive components such as the drive sprockets, idler sprockets and support rollers. Generally, the inside surface of the belt and the drive components are not easily accessible for cleaning, requiring that the conveyor be regularly shut down and maybe even partially disassembled to effect a thorough cleaning and removal of the accumulated organic matter.

There is clearly a need for a conveyor wherein the inside surface can be easily and regularly cleaned to remove unwanted debris, liquids, dust and dirt, especially when such debris comprises organic matter which can decay and foul the conveyor.

SUMMARY AND OBJECTS OF THE INVENTION

The invention concerns an endless conveyor for transporting items and is particularly suited (although not limited) to use in the meat processing industry. Preferably the conveyor comprises at least two rotatably mounted sprockets having respective axes of rotation parallel to one another and arranged in spaced relation along a path oriented perpendicularly to the axes. An endless belt is carried by the sprockets along the path, the endless belt having an outwardly facing surface for supporting the items, such as cuts of meat, and an inwardly facing surface opposite the outwardly facing surface. The inwardly facing surface engages the sprockets.

Preferably, at least one of the sprockets comprises an elongated body having an outer surface for support of the inwardly facing surface of the belt. A fluid conduit extends lengthwise within the body from one end. The one sprocket has a pair of supports for rotatably mounting the body, one of the supports having a fluid inlet communicating with the fluid conduit. A plurality of outlet passages extend from the fluid conduit and terminate in apertures in the outer surface of the body. The inlet passage supplies fluid under pressure to the fluid conduit and the fluid, preferably a cleaning liquid, flows outwardly through the outlet passages and the apertures onto the inwardly facing surface of the endless belt where it cleans that surface.

Preferably, the length of the one sprocket is substantially equal to the width of the belt, and the fluid conduit extends from the one end substantially to the other end of the body. This configuration allows the outlet passages and the apertures to be positioned in spaced relation lengthwise along the body, thus, ensuring that the entire width of the belt is subjected to the cleaning spray of fluid flowing out of the apertures.

While the sprocket may be used with almost any type of conveyor, it is especially effective when used with an endless belt which comprises a plurality of segments arranged side by side. The segments are hingedly connected to one another allowing them to pivot relative to each other when traversing around a sprocket. Because of the many hinges and joints required to ensure flexibility such belts have a marked tendency to accumulate debris on their inside surface as well as other normally inaccessible places such as in the joints between the segments. Cleaning sprockets as described above are particularly suited for use with segmented hinged belts and provide a convenient way to keep the entire belt clean without the need to bring the conveyor out of service for routine cleaning.

The sprocket spraying the fluid can be positioned anywhere along the belt path where it can engage the belt's inwardly facing surface to effectively clean the belt. For example, the sprocket could take the form of a support roller having a smooth outer cylindrical surface and be positioned somewhere between the ends of the belt. Preferably, the sprocket is a driver or an idler positioned at an end of the belt run where the belt segments pivot relatively to one another as they traverse the sprocket and transition to the return leg of their path.

To function effectively as a driver, it is preferable that the sprocket have a plurality of teeth spaced circumferentially around the body projecting radially outwardly to engage the inwardly facing surface of the belt. The belt preferably has a plurality of mating teeth projecting from its inwardly facing surface. The mating teeth on the belt interengage the teeth projecting from the body and allow the sprocket to turn without slipping relatively to the belt and impart the force to the belt necessary to drive it. To accommodate the belt at the end of the run and provide a smooth transition around the sprocket, the tips of the teeth intersect a common imaginary cylindrical support surface which envelops the sprocket.

To ensure that the spray covers the entire inwardly facing surface of the belt, the apertures are arranged in a row extending in a helix lengthwise along and around the cylindrical support surface. The helix arrangement helps to distribute the fluid spray evenly across the width of the belt and ensures that the belt is receiving a continuous spray of fluid across its width and not an intermittent burst, as would occur if the apertures were arranged in a straight line along the sprocket's length.

When the sprocket has teeth to engage the belt, it is preferable to position the apertures in between the teeth, thus, allowing the spray to clean the teeth as well as the belt. Furthermore the region in between the teeth normally does not come into contact with the belt, thus, allowing a continuous spray to be emitted from the apertures under a constant pressure. If the apertures were periodically blocked by contact with the belt, as they might be if located elsewhere on the sprocket, it would cause repeated pressure surges within the fluid conduit, changing the spray pattern and placing unnecessary stress on the various fluid handling components.

To more effectively control the fluid spray, it is preferable to fit nozzles within the apertures. Nozzles can be used to point the spray in a particular direction onto the belt, for example, perpendicularly or relatively tangentially to the inwardly facing surface. Nozzles can also be used to increase the impact force of the fluid stream by directing it into a jet to effectively dislodge stubborn particles or into a diffuse spray to envelop the entire inwardly facing belt surface as required for a particular application. Preferably, the nozzles are oriented substantially radially with respect to the long axis of the body.

It is an object of the invention to provide an endless conveyor wherein the inside surface can be easily and regularly cleaned.

It is another object of the invention to provide an endless conveyor which does not require disassembly to effect cleaning.

It is yet another object of the invention to provide a sprocket for a conveyor through which a fluid can be sprayed onto the inside surface of the conveyor to effect cleaning.

These and other objects of the invention will become apparent from a consideration of the following drawings and detailed description of the preferred embodiment.

Patents
Terms: **patno=6367613** (Edit Search | Suggest Terms for My Search)
View: **Custom**
Segments: Abst, Applicants-ref, English-abst, Summary
Date/Time: Wednesday, November 23, 2005 - 10:34 AM EST

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Patent Number :
US6367613 B1 20020409 [US6367613]

Title :
(B1) Belt cleaning sprocket

Inventor(s) :
(B1) MONTGOMERY PRESTON D (US)

Application Nbr :
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Abstract :
A sprocket for an endless conveyor is disclosed having a plurality of fluid outlet passages arranged radially between the center of the sprocket and its outer circumferential surface. The outlet passages are positioned along the length of the sprocket in a helical path and are in fluid communication with an annular fluid conduit extending lengthwise along the center of the sprocket. A fluid inlet connected to the conduit supplies fluid under pressure to the conduit, the fluid spraying radially outwardly through the outlet passages to impinge on the inside surface of the endless conveyor and remove any accumulated debris. Nozzles are positioned within the outlet passages to control the fluid spray.

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2002-16

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Patent Assignee :

Montgomery, Preston D

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